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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/721,958	11/25/2003	Simon R. Kelemen	RDH-0319	5905

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EXAMINER	
ROGERS, DAVID A	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 04/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/721,958	KELEMEN ET AL.	
	Examiner	Art Unit	
	David A. Rogers	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 January 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *10-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *10-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Final Rejection*.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 10-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Applicant's Admitted Prior Art Knowledge in view of United States Patent 5,492,005 to Homan *et al.* and United States Patent 5,860,394 to Saito *et al.*

Homan *et al.* teaches an apparatus and method for determining the presence of deposits of fuels or fuel additives, hereinafter referred to as fuels. Specifically, Homan *et al.* teaches "[t]he present invention relates to a system for rating fuel and/or fuel additives for their tendency to form and mitigate deposits on solid surfaces." Homan *et al.* also states "[i]ntake system deposits cause operational problems." See column 1, lines 9-14.

In order to determine if fuels have a tendency to form deposits, Homan *et al.* teaches a method and device for rating the fuels. Specifically, Homan *et al.* utilizes a device comprising an enclosed solid nub (reference item 1) with a deposit surface (not labeled); means for controlling the magnitude and duration of the temperature of the deposit surface, that being a surface temperature programmer (reference item 7) and transformer (reference item 13); and a

syringe pump (reference item 4) for introducing fuels onto the deposit surface. Homan *et al.* also teaches that the programmable temperature controller is beneficial as it helps to replicate the actual operating conditions of the fuels (column 2, lines 15-18, lines 45-46). Homan *et al.* further teaches the use of a molecular sieve (reference item10) along with a dryer (reference item 11) and a flow meter (reference item 12) that provides a controlled gas environment to an enclosure (reference item 6). The combination of controlled gas quality and controlled temperature provides for a well-controlled and maintained environment within the enclosure.

The Applicant states in the specification that refinery feedstocks are, for example, coker gas oils, catalytic cycle oils, atmospheric gas oils, coker napthas, catalytic napthas, steam cracked napthas, feedstock mixtures, and the like. See the specification, page 1, lines 9-12. The Applicant also admits that these known feedstocks/oils form deposits in refinery equipment causing operational problems. See the specification, page 1, lines 15-16.

Both the applicant and Homan *et al.* state that fuels, oils, and/or feedstocks cause deposits to form thus causing operational problems. Homan *et al.* teaches a device for determining if fuels cause deposits to form. Using the device of Homan *et al.* in a method for determining if feedstocks also cause deposits would have been obvious given that the apparatus is already well known for use with hydrocarbon-based fluids and is useful for replicating expected operating conditions.

Homan *et al.* specifically addresses simulating engine intake systems. Homan *et al.* does not expressly teach controlling the temperature of the nub so as to emulate a refinery surface. However, Homan *et al.* does teach "[o]ther operating conditions can provide emulation of other deposit formation conditions." Clearly, Homan *et al.* is not restricted to only fuel intake temperatures. Furthermore, the applicant does not define what operating conditions actually simulate operating conditions of *any and/or all* refinery surfaces. Clearly, both the device of Homan *et al.* and the refinery surfaces are at elevated temperatures, but the temperatures are not so high as to cause combustion of the fuels/feedstocks.

The applicant previously argued that, in the present invention, the nub will be heated to between 150 °C to 300 °C, or to just below 350 °C[1]. See the response filed 25 November 2003. At this temperature range the applicant states that the temperatures are too low to form coke during the relatively short time of the test. It is important to note that the applicants do not claim any specific time range and temperature range for the testing of feedstocks.

Furthermore, in Saito *et al.* the fuel intake temperature is disclosed as being about 168 °C in order to mitigate deposits on the surfaces. Based on this one would use the device of Homan *et al.* at a temperature of about 168 °C (replicating expected operating conditions) in order to determine the amount of deposits formed by a fuel. This operating temperature is within the range

[1] The applicant's specification only discloses varying the temperature from 150 °C to 300 °C.

argued by the applicant as being used in the present invention. Therefore, the method to use the device of Homan *et al.* would not need to be altered in order to determine if feedstocks form deposits.

With regard to claim 15, Homan *et al.* discloses the applicant's invention except for the express use of an inert gas such as nitrogen. Homan *et al.* states that their device can be used with air or any other desired gas (column 2, lines 23-25). See also claim 12 of Homan *et al.* Similarly, the applicant discloses on page 3, lines 21-23 that air, or any other desired gas could be used. The applicant's choice of an inert gas to possibly emulate specific conditions or to test in at atmosphere free of reactive materials (nitrogen, for example, is inert) would have been an obvious choice to one of ordinary skill. In the art of testing it is well known, and it is generally accepted practice to simulate the actual working conditions of a material. As such, and in view of the fact that both Homan *et al.* and the applicants teach the use of any gas, using an inert gas would have been an obvious choice for replicating expected operating conditions. Also, in the case of the system of Homan *et al.*, an inert gas would help ensure that an explosive condition is not created when the fuels evaporate into the headspace of the enclosure (reference item 6).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Homan *et al.* to utilize with the known feedstocks from the admitted prior art to provide a method for analyzing these feedstocks for deposit formation.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

United States Patent 3,775,299 to Hepner teaches that feedstocks such as heavy fuel oils are "dirty" and create coking.

Heavy Fuel Oils - Product Dossier 98/109 to CONCAWE teaches several heavy fuel oils and their boiling points. In particular, heavy fuel oils and their boiling points are listed, some of which are recited here.

EINICS No.	***Name***	***Boiling Point***
265-063-0	Distillates (petroleum), heavy catalytic cracked	260 °C - 500 °C
265-082-4	Distillates (petroleum), heavy thermal cracked	260 °C - 480 °C
265-162-9	Gas oils (petroleum), hydrotreated vacuum	230 °C - 600 °C
265-193-8	Residues (petroleum), steam-cracked	~ 260 °C
269-777-3	Residues (petroleum), atmospheric	~ 200 °C
269-783-6	Distillates (petroleum), hydrodesulfurized intermediate catalytic cracked	205 °C - 450 °C
269-784-1	Distillates (petroleum), hydrodesulfurized heavy catalytic cracked	260 °C - 500 °C
270-796-4	Residues (petroleum), heavy coker gas oil and vacuum gas oil	~ 230 °C
270-983-0	Residues (petroleum), heavy coker and light vacuum	~ 230 °C
270-984-6	Residues (petroleum), light vacuum	~ 230 °C
271-013-9	Residues (petroleum), steam-cracked light	101 °C - 555 °C
272-184-2	Gas oils (petroleum), heavy atmospheric	121 °C - 510 °C
274-683-0	Distillates (petroleum), intermediate vacuum	250 °C - 545 °C
274-683-6	Distillates (petroleum), light vacuum	250 °C - 545 °C
274-685-1	Distillates (petroleum), vacuum	270 °C - 600 °C
295-511-0	Residues (petroleum), catalytic cracking	~ 200 °C
295-990-6	Distillates (petroleum), intermediate catalytic cracked, thermally degraded	220 °C - 450 °C
308-733-0	Residues, steam cracked, thermally treated	~ 180 °C
309-863-0	Distillates (petroleum), hydrodesulfurized full-range middle	150 °C - 400 °C

In response to the applicant's argument above, the desired temperature

range covers the temperatures at many heavy fuel oils boil. Clearly, from the teachings of CONCAWE, it is known to have fuel oils that will evaporate at the temperature range between 150 °C - 300 °C. When evaporation occur any solids in solution will be left behind as solids on the surface.

Pollutant Formation and Interaction in the Combustion of Heavy Liquid Fuels to de Blas teaches that it is known to test fuel oils for the presence of particulates or the presence of deposits. In the Abstract of de Blas it is stated that "[d]ecreasing quality and stricter environmental regulations impose potential limitations to the use of heavy fuel oils in combustion and they often produce carbonaceous particulates." de Blas also states "[t]he fuels investigated are by-products of refining operations, and can be differentiated in two groups, namely heavy vacuum gas oils and heavy coker gas oils" (Objective, page 5). de Blas defines carbon residue a "[a] measure of the quantity of solid deposits formed when medium or heavy oils are heated so that evaporation and pyrolysis take place. Carbon residue tests provide an indication of the extent of carbon formation which may be expected in real operation. Carbon residue formation can be estimated by:

> Ramsbottom Carbon Residue of Petroleum Products (ASTM Designation D 524-88): A weighed sample in a glass bulb with a capillary opening is placed inside a metal furnace at approximately 550 °C. The sample is quickly evaporated from the bulb, leaving the heavier residue behind to undergo cracking and coking reactions in the presence of air. The Ramsbottom Carbon Residue is reported as the weight percentage of original sample remaining and therefore it includes ash in the value.

In all, de Blas recognizes the fact that fuel oils, such as the types described by the applicants, may cause deposits to form. de Blas further

teaches that a test similar to that of the Homan *et al.* can be used to determine the formation and of the deposits by a change in weight of a glass bulb.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a). A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to David A. Rogers whose telephone number is (571) 272-2205. The examiner can normally be reached on Monday - Friday (0730 - 1600).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron E. Williams can be reached on (571) 272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dar
12 April 2005

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